



NASA Policy Directive

NPD 8831.1E

Effective Date: June 19, 2003
Expiration Date: June 30, 2023

COMPLIANCE IS MANDATORY FOR NASA EMPLOYEES

Subject: Maintenance and Operations of Institutional and Program Facilities and Related Equipment (Revalidated June 17, 2013 w/Change 1)

Responsible Office: Facilities Engineering and Real Property Division

Chg#	Date	Description/Comments
1	06/17/2013	Update to comply with 1400 Compliance, with administrative changes, title changes, updated Applicable Documents and Forms, and added Attachment B for Acronyms.

1. POLICY

- a. NASA's goal is to improve the institutional management of the Agency's capital assets.
- b. It is NASA's policy to ensure that NASA-owned and operated assets are properly aligned with the NASA mission and are safe, environmentally sound, affordable, the right type and size, and in good operating condition.
- c. NASA's facilities and equipment will be maintained in the most cost effective fashion to minimize risk to processes and products, protect the safety and health of personnel and the environment, protect and preserve capabilities and capital investments, provide quality work places for NASA employees, and enable the Agency's mission.
- d. NASA will apply the NASA reliability-centered maintenance (RCM) approach which employs a full range of maintenance strategies varying from "run to failure" to "streamlined failure mode and effects analysis (FMEA) combined with predictive testing and inspection (PT&I)" to institutional and program facilities and related equipment.
- e. The Agency policy will be accomplished by:
 - (1) Using state-of-the-art management techniques that optimize maintenance activities with respect to risk management and cost. RCM practices and appropriate modern PT&I diagnostic techniques will be employed. RCM and PT&I will be incorporated into facilities and/or equipment program development, improvement, and implementation to minimize life-cycle maintenance and repair costs, maintain facilities and equipment at the desired level of reliability, and maximize safety. These principles are outlined in the NASA Reliability Centered Maintenance for Facilities and Collateral Equipment and the NASA Reliability Centered Building and Equipment Acceptance Guide. These guides and other resources are located at: <http://www.hq.nasa.gov/office/codej/codejx/under O&M adn Design and Construction respectively>.
 - (2) Using accepted standards as guidelines to determine facilities and equipment maintenance funding requirements when detailed requirements and associated estimates are not available to serve as a basis for maintenance cost projections.
 - (3) Generating, tracking, trending, and managing facilities maintenance activities by using appropriate performance metrics to enable overall maintenance program review and continuous improvement.
 - (4) Undertaking benchmarking activities that result in identifying, sharing, and implementing "best practices."
 - (5) Ensuring that each Center carries out the Agency policy by:
 - (a) Developing and documenting an appropriate failure analysis for all critical facilities and equipment when failure of

the facility, facility component, or equipment might result in damage to flight hardware which in turn would cause significant disruption in flight, research, or operations schedules; cause severe injury or death; or cause significant embarrassment to the Agency. Failure analysis will be documented via FMEA, fault-tree analysis, or comparable analysis as appropriate to serve as a basis for risk mitigation planning.

(b) Maintaining a list of critical facilities and equipment with accompanying rationale for the designation.

(c) Establishing the most cost-effective approach regarding Computerized Maintenance Management Systems (CMMS) to best meet their particular needs and satisfy Integrated Financial and Integrated Asset Management Program requirements. Employing automated tools to facilitate maintenance is a benchmark for maintenance excellence.

(d) Developing and monitoring performance of an Annual Work Plan (AWP) that defines and quantifies, in terms of budget dollars and/or workforce estimates, all scheduled maintenance to be accomplished in the following fiscal year and documenting all accomplishments in the current year. Annual maintenance and repair plans/proposals for institutional and program facilities and related equipment will reflect the level of activity necessary to arrest annual growth of deferred maintenance, such as at the level indicated by the Facility Sustainment Model. The AWP will address:

(a) Preventive maintenance, programmed maintenance, repair, and replacement of obsolete items.

(b) Projected operating costs for central utility plants and other services such as grounds care.

(c) Allocations for nonscheduled work: trouble calls, emergency work, and nonmaintenance service requests.

(e) Accounting for facilities and equipment maintenance and repair expenditures in accordance with the current NASA Financial Management policies. NASA contractors that are responsible for facilities maintenance will be required to provide necessary maintenance spending data at individual facility-level detail.

g. Assessing facility and equipment conditions by participating in the application of the NASA Deferred Maintenance Parametric Estimating Guide. Scheduled and unscheduled maintenance and repair visits shall also be used to record condition codes of facilities and equipment for use in the CMMS.

h. Using Performance-Based Contracting (PBC) and best-value principles to the maximum extent feasible and practical to shift the appropriate degree of cost risk to contractors and maximize competitive pricing. PBC contracts for operations and maintenance of facilities shall be fixed-price and/or unit-priced when the scope of services can be determined. The maximum amount of known annual requirements shall be consolidated into the fixed-priced core of any PBC.

2. APPLICABILITY

a. This NPD is applicable to NASA Headquarters, all NASA Centers, Component Facilities, other NASA owned facilities, all contractors performing facilities maintenance for NASA, and the Jet Propulsion Laboratory, a Federally Funded Research and Development Center, to the extent specified in their contracts.

b. In this directive, all mandatory actions (i.e., requirements) are denoted by statements containing the term "shall." The terms: "may" or "can" denote discretionary privilege or permission, "should" denotes a good practice and is recommended, but not required, "will" denotes expected outcome, and "are/is" denotes descriptive material.

c. a.c. In this directive, all document citations are assumed to be the latest version unless otherwise noted.

3. AUTHORITY

a. The National Aeronautics and Space Act, 51 U.S.C. § 20113(a).

b. Standard Numbers 6, 8, 14, 35, and 40 of the Federal Accounting Standards Advisory Board, dated May 11, 2011, as amended.

4. APPLICABLE DOCUMENTS

a. Federal Buildings Personnel Training Act of 2010, Pub. L. No. 111-308, 124 Stat. 3283 (2010).

b. NPR 8831.2, Facilities Maintenance and Operations Management.

c. NASA Reliability Centered Maintenance Guide for Facilities and Collateral Equipment, September 2008.

d. NASA Reliability Centered Building & Equipment Acceptance Guide, July 2004.

5. RESPONSIBILITY

a. The Director, Facilities Engineering and Real Property Division, as designated by the Assistant Administrator for Strategic Infrastructure, shall provide the tools, policies, and corporate leadership in a participative manner that fosters Agency-wide ownership and continuous improvement in facilities maintenance. Agency-wide ownership means taking a holistic stewardship perspective. Primary roles include developing and disseminating policy, funding advocacy, facilitating broad guidance for adopting "best practices," and reporting Agency-wide status.

b. The NASA Chief Engineer shall provide technical advice and support for evaluation and introduction of new technology, analysis, and technical management techniques, such as RCM, for improving the facilities and equipment maintenance process.

c. The NASA Chief Financial Officer, or designee, shall ensure proper accounting of facilities maintenance, repair, and operations expenses.

d. The Assistant Administrator for Procurement, or designee, shall ensure that all contracts containing facilities maintenance work require contractors to provide functional management costs to be used in the NASA accounting system and that fixed-priced/unit-priced performance-based contracting is used to the maximum extent feasible and practical for facilities maintenance and operations.

e. The Center Directors shall budget for and provide oversight of facilities maintenance requirements for both institutional and critical program facilities and equipment commensurate with the principles of this directive.

f. The Center Directors shall implement the policies of this directive and are responsible for the overall condition, functional usability, reliability, safety, and appearance of all NASA facilities, as well as long-term stewardship for the future use of all NASA facilities and equipment.

(1) As such, they shall identify and designate a single point of contact to serve as the focal point for all facilities and equipment maintenance issues; prepare the list of critical equipment, develop, and implement cost-effective, efficient, reliable, and safe facilities maintenance programs, incorporating the policy and implementing guidance as set forth in this directive and NASA NPR 8831.2, Facilities Maintenance and Operations Management.

(2) They also shall provide timely reports, as required, for the purposes of ascertaining program status.

(3) They shall ensure that all NASA Maintenance and Operations civil servant and contractor staff meet the requirements of the Federal Buildings Personnel Training Act of 2010.

6. DELEGATION OF AUTHORITY

None.

7. MEASUREMENT/VERIFICATION

a. Performance measurements may be established in NPR 8831.2, Facilities Maintenance and Operations Management, the Annual Budget Call by NASA Headquarters CFO, currently called Planning, Programming, Budgeting, and Execution (PPBE) guidance, and/or memorandum from the Director, Facilities Engineering Division, or the NASA Chief Engineer.

b. Performance metrics for each NASA site for the past fiscal year are due to NASA Headquarters, Facilities Engineering and Real Property Division, by November 30 of each year.

8. CANCELLATION

NPD 8831.1D, Maintenance and Operations of Institutional and Program Facilities and Related Equipment, dated June 19, 2003.

ORIGINAL SIGNED BY

**/s/ Sean O'Keefe
Administrator**

ATTACHMENT A: (TEXT)

Definitions:

Critical Facilities/Equipment: Equipment necessary to manufacture, test, or process critical hardware (such as flight hardware). Equipment whose failure could cause injury or death, cause more than \$1 million in damage (see NPR 8621.1, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping), could cause embarrassment to NASA or a specific Center, or could cause significant schedule impacts to important programs. This does not include typical building systems such as heating, ventilation, air conditioning, and electrical distribution.

Facilities maintenance: The recurring day-to-day work required to preserve real properties (land, buildings, structures, utility systems, collateral equipment, and other permanent improvements) in such a condition that they may be used for their designated purpose over an intended service life. It includes the cost of labor, materials, and parts. Maintenance minimizes or corrects wear and tear, forestalling major repairs.

Failure Mode and Effects Analysis: Analysis used to determine what parts fail, why they usually fail, and what effect the failure has on the systems in total. An element of reliability-centered maintenance.

Reliability-Centered Maintenance: A process used to determine the most effective approach to maintenance which involves identifying the actions that, when taken, will reduce the probability of failure and which are the most cost-effective.

ATTACHMENT B: (TEXT)

Acronyms:

AWP Annual Work Plan

CMMS Computerized Maintenance Management Systems

FMEA failure mode and effects analysis

PBC Performance-Based Contracting

PT&I predictive testing and inspection

RCM reliability-centered maintenance

(URL for Graphic)

None.

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